

REMARKS

Claims 2, 4 and 7 have been amended. Claims 1, 3, 6, 8 and 12 have been canceled. Claims 13-14 have been added. Claims 2, 3-5, 7, 9-11 and 13-14 are pending.

Claim Rejections – 35 U.S.C. 103

Claims 2, 4, 5, 7 and 8-11 were rejected over Japan Patent JP-07-060074 (JP '074) in view of U.S. Patent No.6,156,200 to Zha.

Claims 2, 4 and 7 have been amended to recite, “the cylinder has an inner diameter between 1.5 and 3 times the bundled end diameter.” The claim amendments add a feature that characterizes the diameter of the filter cylinder. The diameter of the filter cylinder specifies the extent to which the fiber bundle can “fan out” as a broom, when the filter is use.

The fanning out of the hollow fiber membranes (6a) into a broom provides gaps between individual fiber membranes to allow sufficient raw fluid (W1) to enter an inner region of the fiber membrane module 6. It is, therefore, possible to make use of more of the hollow fiber membranes from an outer peripheral region to a central region of the hollow fiber membrane module, thereby improving the filtration efficiency. Page 11, line 24 to page 12, line 13. The inner diameter of the filter cylinder (2) is 1.5 to 3.0 times the diameter of the bundled end of the hollow fiber members to permit the free end of the fibers to fan out into the broom pattern to effect the gap between the individual fibers and hence improve the filtration efficiency. Page 7, lines 19-21. Thus, the diameter of the filter casing must be sufficient to enable the hollow fiber membranes to improve filtration efficiency.

Neither Zha nor JP '074 recognize that the fanning out of the fiber bundle can improve the removal of the deposits from the outer periphery of the hollow fiber membranes by action of the fluid and the gas. The Zha reference teaches away from enabling the hollow fiber membranes to fan-out by suggesting that the fiber membranes are arranged in bundles surrounded by a perforated cage, which serves to prevent movement of the fiber membranes. Col. 2, lines 22-26. A screen or cage (8) surrounds the array (5) and serves to hold the fibers (9) in close proximity to each other and prevent excessive movement. The fibers are fixed

uniformly within the potting heads (6) and (7) and the holes (10) are formed uniformly relative to each fiber (9) so to provide, in use, a uniform distribution of gas bubbles between the fibers.

Col. 4, lines 61-65. Thus, it is a feature of the Zha reference to provide for a more uniform distribution of gas bubbles between the fibers. This is achieved, in part, by fixing the ends of the fibers in the potting heads to have a uniform distance therebetween and restricting the movement of the hollow fibers by a cage. Col. 6, lines 63-65. Thus, enabling the free end of the fibers to fan-out as recited in claim 2 would be in direct opposition to the teaching of Zha. There is no suggestion in Zha that enabling the fibers to fan-out during use would improve removal of deposits from the periphery of the fibers.

The JP '074 reference provides for a limitation on the volume of the space (5) that holds the permeated liquid as a percentage of the total volume of the fiber membrane chamber (6). Constitution and Purpose. There is no suggestion that JP '074 recognizes that fanning-out of the hollow membranes can improve the removal of deposits from the periphery of the fibers.

Further, there is no motivation to combine the teachings of Zha and JP '074. Zha teaches fixing the fibers at both ends to prevent movement and having uniform distance therebetween. JP '074 has one end of the fiber membranes free to move. One would not be motivated to combine references that teach opposite approaches to restricting movement of the fiber ends.

The Office Action states that it would have been obvious to one of ordinary skill to provide a cylinder ID sufficient to have free movement of the fibers inside of the cylinder. The Applicant respectfully disagrees. Zha teaches preventing or limiting the movement of the fibers to maintain a uniform distance between the fibers. While the fibers of JP '074 have a free end, there is no indication that JP '074 recognizes that the free end should fan out to the degree recited in claims 2, 4 and 7 to create gaps between the individual fibers to permit fluid to enter into an inner region of the fiber membrane module.

The Applicant respectfully requests withdrawal of the 35 U.S.C. 103 rejection of independent claims 2, 4 and 7.

Claims 3, 5 and 9-11 depend from one of claims 2, 4 or 7 and should be allowable for at least the same reasons.

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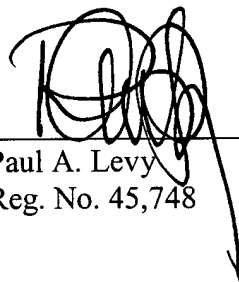
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New Claims

Claims 13 and 14 have been added to recite features that are disclosed, for example, at page 9, lines 11-20. No new matter has been added.

The Applicant does not believe that any fees are due. However, please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Paul A. Levy', is written over a horizontal line. The signature is stylized and cursive.

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